The Role of Storage Reservoir Management in Columbia River Salmon Protection

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Findings of Congress

Endangered Species Act of 1973

- "Various species of fish, wildlife, and plants have been rendered extinct as a consequence of growth untempered by adequate conservation."

- "These species are of esthetic, ecological, educational, historical, recreational, and scientific value to the nation and its people."

Thus, the Endangered Species Act is the last resort for species at risk of extinction. Under the ESA, the National Marine Fisheries Service (NOAA Fisheries) is accountable to ensure that salmon and marine species are preserved for future generations.

Federal Columbia River Power System (FCRPS)

- Dams and reservoirs on the mainstem Columbia and Snake rivers and their tributaries comprise the FCRPS.

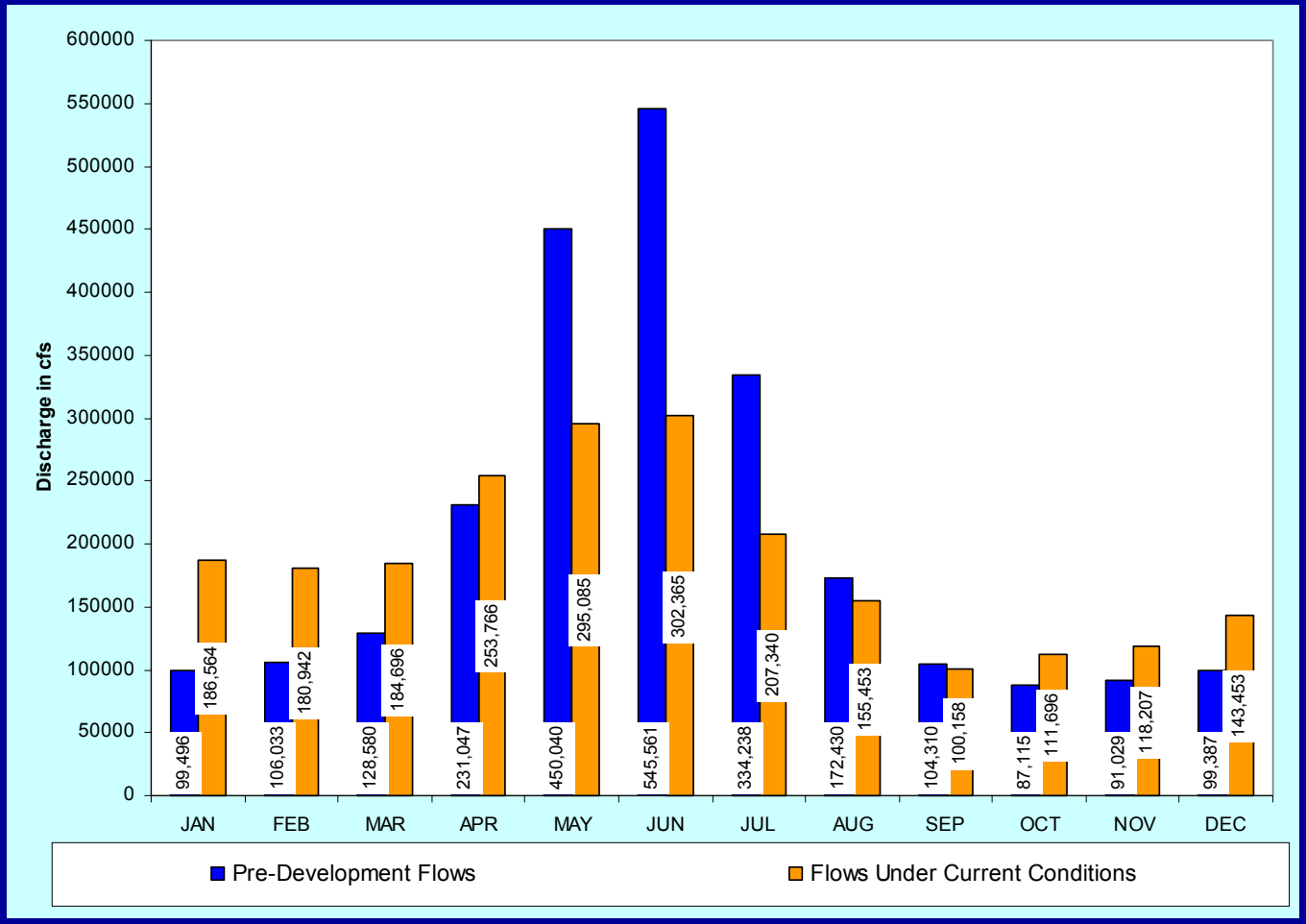
- Operation of this dam and reservoir system is a federal action and subject to ESA consultation.


Scope of Federal Salmon Recovery Initiatives
Canadian Dam
Federal Dam
Non-Federal Dam
Federal Strategy affects 12 stocks across Columbia Basin & Pacific Ocean
Columbia River & Snake River System
Blocked Passage
Chum Salmon
Chinook Salmon
Steelhead
Sockeye Salmon
Puget Sound
Washington
Montana
Snake River
Pac ific Oce an
Columbia River
Willamette River
Oregon
Wyoming
Idaho
California

Juvenile Migration

Salmonids evolved to migrate under flow conditions with a natural hydrograph. Due to the small size of smolts, the limited ability to store energy reserves, and the long distance they must travel, fish rely tremendously on flow (water velocity) to move them to the ocean.

Effect of reservoir construction and regulation on seasonal flows in the Columbia River

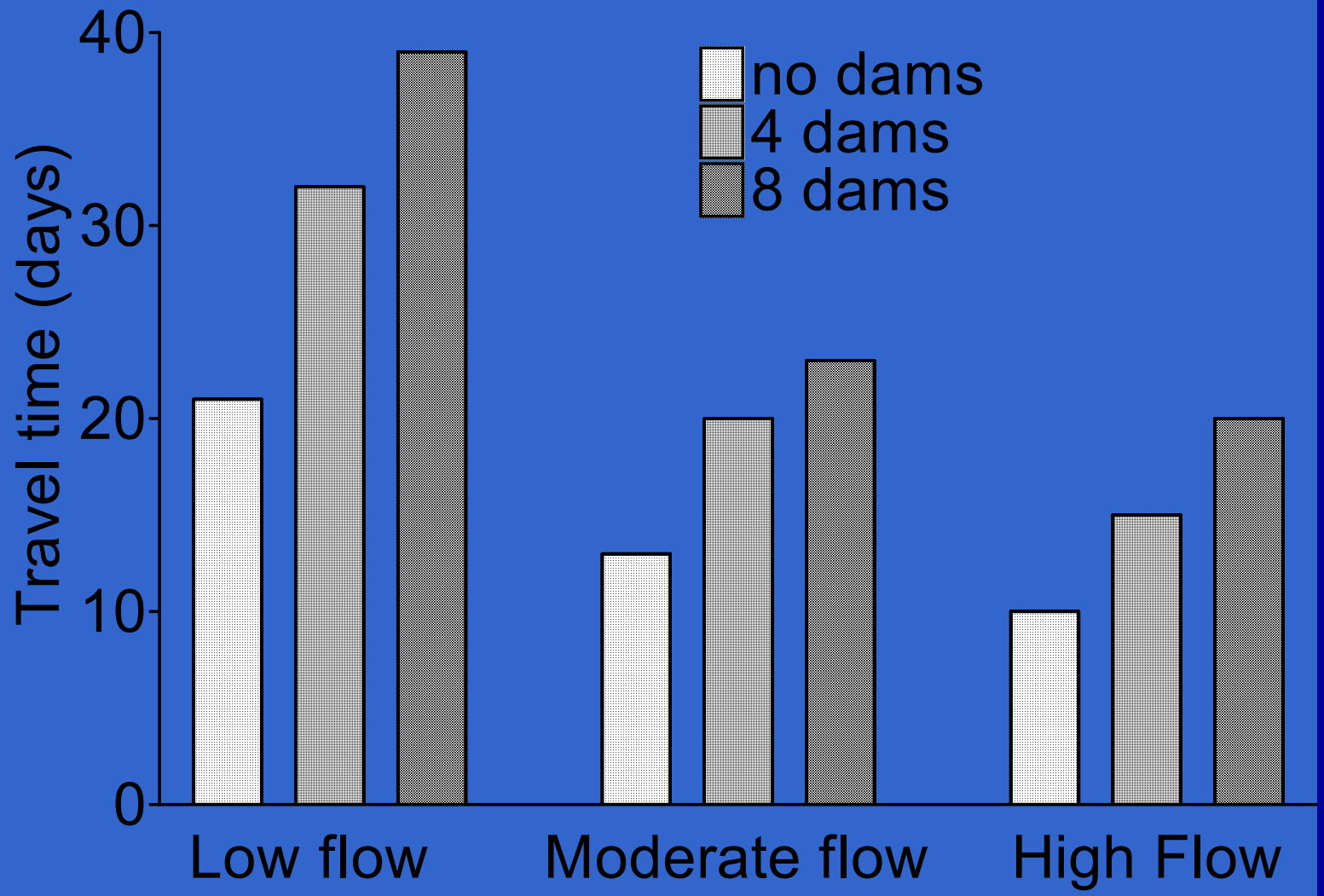


Travel Time

Travel time affects arrival to and through the hydropower system and thus, timing to the estuary and ocean.

A strong and consistent relationship exists between flow (water velocity) and juvenile salmon travel time on their way to the ocean

Estimated yearling chinook travel time - Lewiston to Bonneville Dam



Snake R.	(35-53 kcfs)	(71-106 kcfs)	(106-177 kcfs)
Columbia R.	(141-177 kcfs)	(212-318 kcfs)	(353-494 kcfs)

Actions called for in opinions

- Dam Operations
- Dam Modifications
- Spill at Dams
- **Flow Measures**
- Research Monitoring & Evaluation
- Transportation
- Hatcheries
- Habitat

Basis for Managing Flow

- Evolutionary Considerations
- Recognition of the flow/travel time relationship for juvenile salmon
- Data suggesting survival benefits over the life cycle of salmon (SARs)
- Beneficial effects of a freshwater plume to estuary and near ocean environmental processes

How do the Biological Opinions Affect Libby Operations?

- 1995 Opinion
  - required flood control reservoirs to be at rule curve by April to improve spring flows and the probability of refill
  - required summer drafts of storage reservoirs to enhance flows
  - required USACE to investigate then current flood control operations to determine if similar levels of protection could be provided while improving refill and migration season flows

How do the Biological Opinions Affect Libby Operations?

- 2000 Opinion
  - continued 1995 actions
  - required implementation of modified flood control operations termed VARQ at Libby and Hungry Horse dams. VARQ was the result of USACE's investigation of flood control operations required by the 1995 opinion

How do the Biological Opinions Affect Libby Operations?

- 2004 Opinion
  - USACE committed to implement VARQ interim operations at Libby Dam

VARQ

- Designed to provide:
  - higher discharge during reservoir refill period, reducing spring juvenile salmonid travel time
  - a high likelihood of reservoir refill to supply water for summer flow augmentation to reduce summer juvenile salmonid travel time
  - a very similar level of flood protection as exists under the Columbia River Treaty Operating Plan

Conclusions

- NMFS is charged with protecting and recovering anadromous fish species listed under the ESA.
- Libby Dam is part of the FCRPS and its operations have been considered in several Biological Opinions covering FCRPS operations.